

1. Quantification of Trust Water Rights for Secondary Reaches

Below is a description of the preferred method of calculating a trust water right for the secondary reach, commonly called the “bell curve” method.

The annual quantity of consumptive use is proportionally pro-rated throughout the irrigation season. The crop consumptive use (usually CIR) is used as the basis of this calculation although other calculations can be made using flow meter data, etc. Using a guide such as the Washington Irrigation Guide, it is possible to determine the water requirement for each month during the irrigation season. Using the monthly percentage as a guide, the total annual quantity is allocated in a manner closely resembling the crop consumptive use pattern throughout the irrigation season. It should be pointed out that the trust right is not static throughout the season creating different regulatory targets for different months.

Below is an example of a trust water right calculation based on the following assumptions:

A water right for 6 cfs,
992 AF/Y (includes 75% efficiency factor),
774 ac-ft CIR (consumptive use),
300 acres of alfalfa near Ellensburg,
180-day irrigation season from May through October.

We Startby determining the consumptive use of the water right (CU). In most cases it is the crop irrigation duty or water use based on power records (minus return flows), etc. In this example, it is assumed that the CU is determined to be 774 ac-ft. The consumptive use of the water over the growing season needs to be pro-rated in a manner consistent with the pattern of water consumed. Based on a guide like the Washington Irrigation Guide, a proportionate amount of consumptively used water per month can be determined. In this case for alfalfa at Ellensburg the distribution is:

May	June	July	Aug	Sep	Oct
7.5%	22.1%	30.4%	24.2%	13.7%	1.9%

Pro-rating the 774 ac-ft out in these proportions we get the following monthly distribution:

May	June	July	Aug	Sep	Oct
58.4	171.4	235.6	187.4	106.3	14.9
ac-ft					

A continuous instantaneous rate based on the monthly volume of water is then calculated. So for the month of August, the calculations look like this:

187.4 ac-ft multiplied by 325851 about 61 million gallons
Divide by 31 (days) about 2 million gallons per day
Divide by 1440 (minutes per day) = 1,368 gallons per minute
Divide by 449 (gpm per cfs) = **3.05 cfs**

Using similar calculations the distribution, in cfs, for each month is as follows:

May	June	July	Aug	Sep	Oct
0.98	2.88	3.83	3.05	1.79	0.24
cfs					

This is a representation of the amount of water in CFS that would have been consumed in each of these months, and that we could protect from junior water users in the stream during those months.